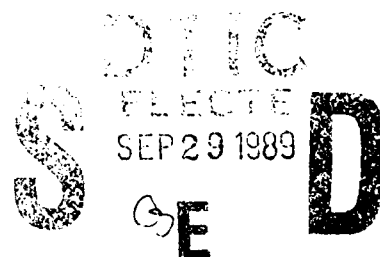AD-A213 268

Select the Text: A Macintosh Moving Window Application.

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The moving-window technique has typically been used to expose one word of text at a time. This Macintosh application adapted that technique to expose one sentence at a time. Text is input into files that can be ordered in any desired sequence. The screen display consists of "blacked-out" sentences that are exposed by "clicking" on the desired segment. Each segment is a sentence in length. Text is displayed an entire screen at a time and text formatting conventions can be incorporated into the display. This application permits students to select sentences in any order and in any location of the text. For text longer than one screen, scrolling brings up additional text. The application records the sequence in which the sentences were read and how long they were read on each exposure. The sequence, process time per word and rate per word for each sentence are computed and printed in an output summary table.

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Select the Text: A Macintosh Moving Window Application

In work designed to understand the strategies that people employ during reading it is important to be able to trace their progress through the text and determine the amount of time spent on different segments of the text. A very direct way to obtain this information is through eye-movement research (Just & Carpenter, 1984). However, eye movement cameras are quite costly to obtain and maintain. Techniques such as the moving window (Just, Carpenter, & Woolley, 1982) closely approximate gaze-duration information obtained from eye movement technology. The advantage of the moving window technique is that it can be implemented on a microcomputer. Typically, one word at a time is exposed and the exposure sequence as well as the time spent on each word are recorded (e.g., Post, 1984). The current application is an adaptation of the moving window technique for the Macintosh environment.

The basic program operates by presenting a screen full of text in which all sentences are "blacked out". Indentations for paragraphs are white spaces and sentences are separated by white space. Thus, the layout of the text can be seen and the position and length of the various sentences is evident. The reader uses the mouse to "click" on a sentence to expose it. The need for an application such as this one became apparent as a result of some of our prior work. We had developed a text presentation program called READIT! (Saul, Pohl, & Goldman, 1988). In that application, sentences were presented one at a time on the screen in their order in the text. However, readers could go back and forth in the text to review sentences that they had already

seen. The application kept track of the sequence and time per sentence information and from that data we were able to construct time graphs that depicted reader strategies (Goldman, 1989). The limitation of the READIT! application was that only one sentence could appear on the screen at a time. As a consequence, information regarding the position of the sentence in a paragraph and the size of the paragraph and entire text were lost. In analyzing the data from several studies conducted with the READIT! application it became apparent that paragraph indentation, length, and position of the sentence in the paragraph were factors that exerted control over reading strategies. The goal of the current adaptation of the moving window technique was to preserve in the text display information regarding paragraphing and position.

The Select the Text application permits the user to input a number of passages and organize them in any sequence desired. The sequence is then presented and a complete record is kept of the sentences selected, the order of selection, and the time spent examining the selected material. Output summaries of the data are produced. Thus, using Select the Text, the user can relate reader strategies to sentence content as well as to structural features of the passage. The remainder of this report details the Select the Text application, including how to use it, system requirements and known bugs. Information about obtaining the software and the source code is found at the end of this document.

System Requirements

You need either a Mac Plus or a Mac 512Ke with System 4.1 or higher to run this program. It would also be *very* nice to have a hard

drive, as some of the functions (especially opening the output files) take a long time if run from floppies.

Setting Up

Start by arranging your disk(s). Select the Text actually consists of two applications: MoveWind and MakeMoveWindTest. Place the MoveWind and MakeMoveWindTest applications on a disk in a configuration similar to the following:
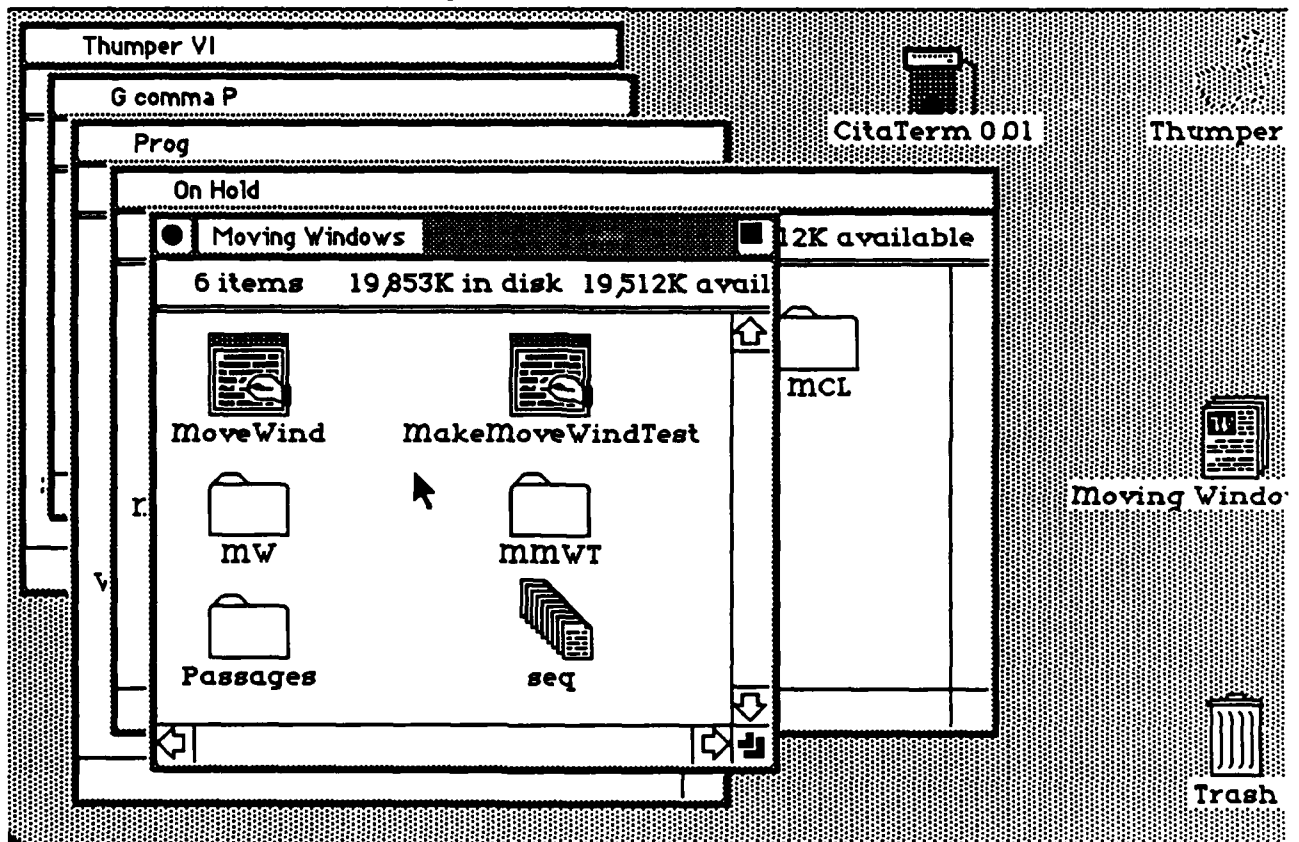

Figure 1.

In Figure 1, "MoveWind" and "MakeMoveWindTest" are the two applications. "MoveWind" is the text presentation application and "MakeMoveWindTest" is the application in which the specific passages and passage sequences are created. The folder "Passages" (or any

number of folders with similar positions and arbitrary names) holds the texts that will be presented by the Moving Window application. The passages to be presented must be in the same folder as MoveWind and Make MoveWindTest, as shown in Figure 1.

Writing and Building a Sequence

Starting up: Double-click on "MakeMoveWindTest." You will be presented with the following dialog:

Moving Windows Test Maker

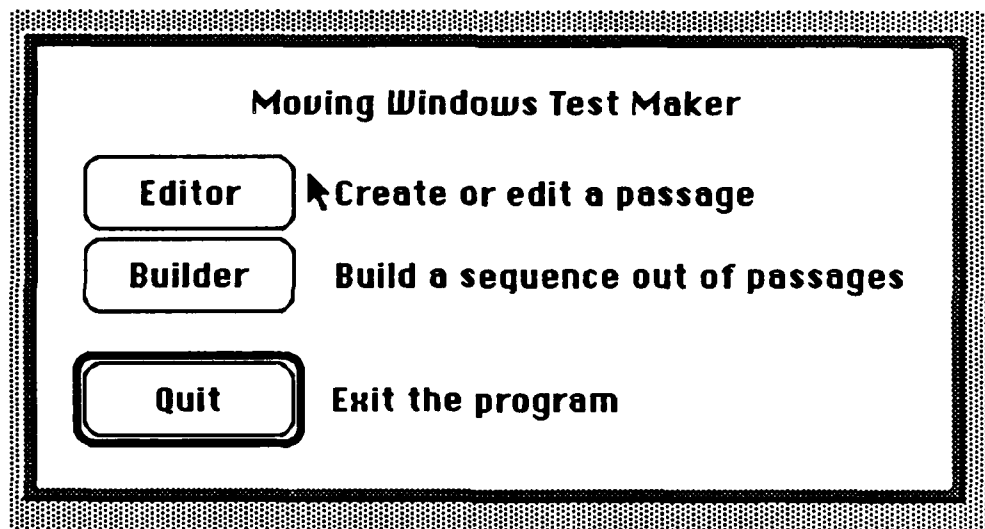| Editor | ▶ Create or edit a passage |
| Builder | Build a sequence out of passages |
| Quit | Exit the program |

Figure 2.

There are two parts to MakeMoveWindTest, the passage editor and the sequence builder.

Editing Passages: The editor is where you may compose passage texts.

• Click "Editor" to be taken to a standard MacWrite-like editor. This editor reads and writes files of type TEXT and of a custom creator. What this means is that you can read the files created with

this editor with any word processor application or text editing Desk Accessory. If texts are created in other word processor applications, they need to be **copied** into the MoveWindMakeTest Editor. (Access the text in the word processor; copy or cut it to the clipboard. Then open the MW Editor and paste the text in.) To edit the text files once you have created them in the MW Editor, click on "Editor" in the dialogue box shown in Figure 2. An untitled screen will come up; to access the file you want to edit go to "open" under the File menu and then click on the passage you want to edit. Double clicking the icons for the text files you have saved in the Moving Window editor will get you to the dialog box shown in Figure 2. From there you can click the "Editor" button and access your file through the File Menu selection "open".

• Not all of the regular Mac Menu bar selections are functional in this application. However, the editor *is completely functional* without some of the more frilly features. Everything works in the File menu, the Edit and the Font menus. The editor looks like the following:

 File   Edit   Search   Font   Settings   Windows

● Untitled 1	■

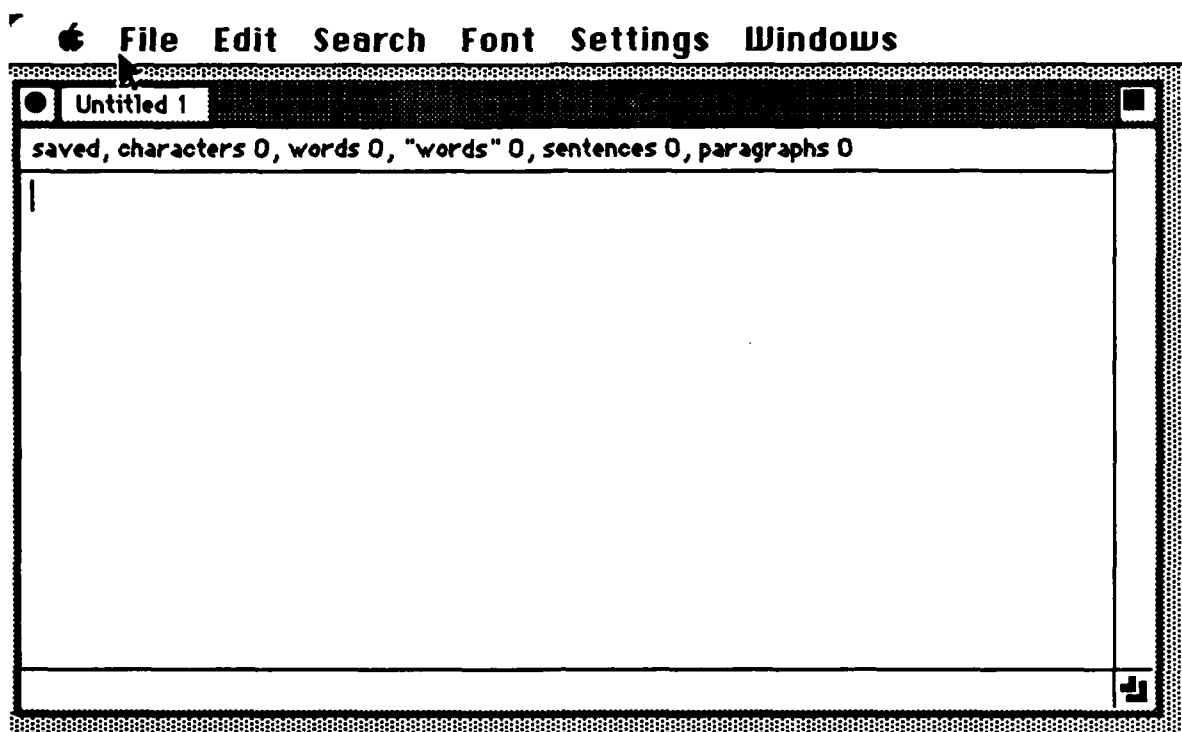saved, characters 0, words 0, "words" 0, sentences 0, paragraphs 0

Figure 3.

Note that there are no scroll bars. You can still scroll a passage if you need to by selecting the text and dragging above or below the bounds of the window. As you move up or down in the window the text will "scroll" and extend the highlighted portion of the passage. When you have scrolled to what you want (i.e., the portion of the text you wanted visible inside the text window), click once inside the text to end the selection-scrolling process and resume editing the passage.

Rules for Writing Passages: The MakeMoveWindTest editor will save any file you care to type into it. However, for MoveWind to know how to deal with a passage as a passage, you need to follow some rules.   MoveWind searches for end-of-sentence-markers to properly segment the text into sentences.   MoveWind recognizes three characters as end of sentence markers: the ., the !, and the ?.

Accordingly, end sentences with one of these three punctuation marks [. or ! or ?] and no other characters. Parenthetical sentences should not be used (This is a parenthetical sentence.) If you must use a title, then end with one of the end-of-sentence markers. Punctuation must occur outside of quotation marks, i. e., "?, not ?". Do not type out ellipsis (...); these can be used in the middle of a sentence by pressing [option] and [;] keys simultaneously. Finally, the decimal point in a number will be interpreted as an end-of-sentence marker; thus you cannot include decimal numbers in your texts. Violating any of these rules will probably not cause MoveWind to crash, but you'll wind up with incorrectly segmented text.

Be aware that what you type in the editor is not WYSIWYG (what-you-see-is-what-you-get) — MoveWind will reformat your text when it is presented on the screen. Also note that tabs will not show up in the editor as anything more than spaces but they will be expanded in MoveWind to look like real tabs.

Saving and quitting: To save a passage, choose SAVE AS from the File Menu. When you Save for the first time, you will be presented with the usual save dialog:
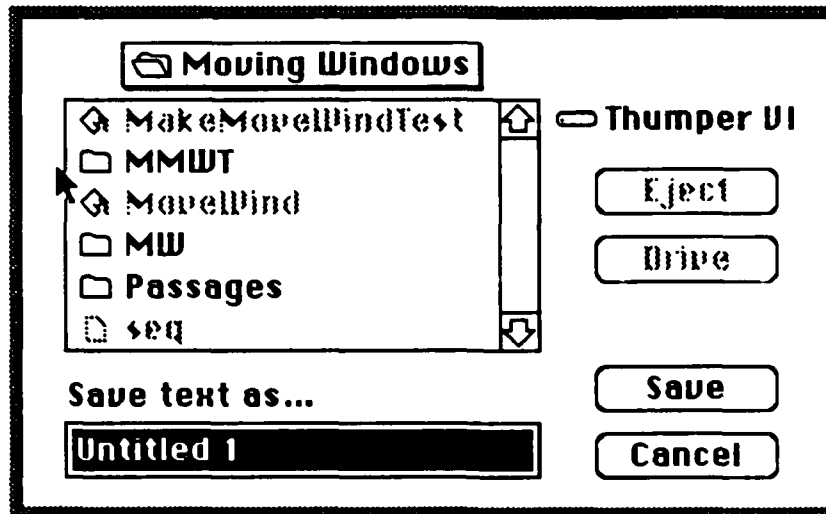
Figure 4.

The MovingWindow editor saves the text as a text only file. MAKE SURE you save EACH passage in one of the folders in this list by double-clicking on the folder you want the passage saved into before you title and save it! If you don't, you'll just have to move the passage later. Failing to save the passages into one of the legal folders will cause the builder portion of the program to be unable to find any of your passages. Note: If you wish to present instruction pages or other non-experimental information to subjects during the course of the experiment, you can do so by typing the information in the editor as you would the experimental text, and then saving your passage with the name "Recall page" (that *exact* name, without the quotes of course). This text won't be tabulated into the MoveWind summary data.

Building a sequence: To put passage texts together in a presentation order you use the sequence builder. When you quit the editor, you will be returned to the dialog you saw in Figure 2. Click "Builder" to go to the builder portion of MakeMoveWindTest. You will be

presented with a screen like the one shown in Figure 5. When you begin to build your test file sequence, the right two columns will be empty.
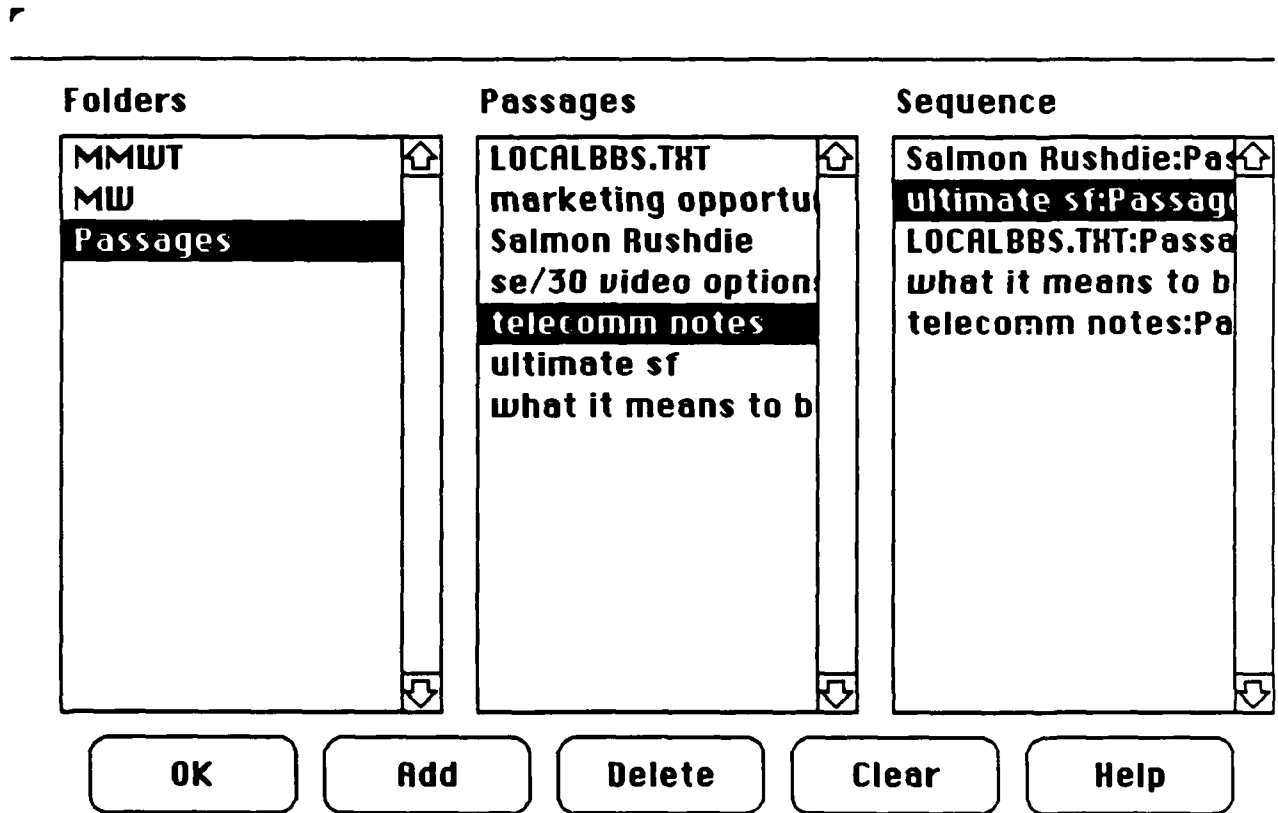
r

Folders	Passages	Sequence
MMWT **MW** **Passages**	**LOCALBBS.TXT** **marketing opportu(** **Salmon Rushdie** **se/30 video option:** **telecomm notes** **ultimate sf** **what it means to b**	**Salmon Rushdie:Pa** **ultimate sf:Passag(** **LOCALBBS.TXT:Passa** **what it means to b** **telecomm notes:Pa**

(OK)   (Add)   (Delete)   (Clear)   (Help)

Figure 5.

Figure 5 shows a sequence which has already been partially built. In the left list are the folders you set up earlier. In the middle list are the passages you saved in the folder that is highlighted in the leftmost column. In the right list are the passages which you have installed into the sequence you are building. Click on one of the folder names in the left list to get the middle list to display the passages in that folder. (Important: you may do this at any time; MakeMoveWindTest allows you to install passages from any of the folders listed into your

sequence in any order.) Click on one of the passages in the middle list to select it, then click the "Add" button at the bottom to install the passage into your sequence. The name will appear (with its folder name on the end of it) in the right list. You may click on a passage in the right list (which has been installed in the sequence) and then click the "Delete" button to remove it from the sequence. The "Clear" button wipes all the passage names from the sequence list on the right. The "Help" button will get you a dialog which briefly summarizes these operations.

The "OK" button will bring up a dialog asking you if you want to save your sequence, not save it, or go back to editing it. If you click "Cancel," you may continue to edit the sequence. If you click "No," the sequence will be discarded. If you click "Yes," you will be given a Save dialog much like the one you got in the editor portion of MakeMoveWindTest. Clicking "Cancel" at the Save dialog will fail to save the sequence and dump you back at the initial dialog (figure 2). Clicking "Save" will allow you to save the sequence anywhere; normally you'll want to save your sequence in the same folder as MakeMoveWindTest.

Running MoveWind

MoveWind is the program that allows you to present subjects with passage sequences and compute data on the subjects' reading behaviors. When you have finished building all of your passage sequence files and are ready to present a sequenct to a reader, double-click the MoveWind icon. You will be presented with the following dialog:

it just right to skip a passage. Note also that sentences which span more than three lines will be block black in the middle — this is normal. When the reader has completed all the passages in his/her sequence or test, MoveWind will save the output data for that reader and re-present you with the initial dialog (Figure 1).

Output

When you Open an output file (it will appear as a Microsoft Word 3.0 (or higher) document), you will be presented with a dialog which asks "Interpret RTF text?" Click OK. This will take a little while, but it is worth waiting for, because the output file is formatted for you, including font choice, special margin settings, and centered headings. You will need Geneva 9, 10, and 12 installed in your System for the formatting to work completely. Geneva font came with your Mac — if you can't find it, your Apple dealer has a copy.

Interpreting the Output Files: Table 1 provides a sample output file.

Table 1

Select the Text Output for Subject #1

Passage # 1, ":Passages:what it means to be a prog'er"

Sentence List:

1	Our documentation manager was showing her 2 year old son around the office.
2	He was introduced to me, at which time he pointed out that we were both holding bags of popcorn.
3	We were both holding bottles of juice.
4	But only *he* had a lollipop.
5	He asked his mother, "Why doesn't HE have a lollipop"?
6	Her reply: "He can have a lollipop any time he wants to.
7	That's what it means to be a programmer".

Raw data:

S#	seconds
5	1.750
7	1.733
2	1.317
5	7.350
1	1.067
2	1.667
5	1.050
6	0.717
7	0.800
6	0.683
5	0.683
4	1.950
3	0.733
2	1.183
1	1.867

<PAGE BREAK>

Summary data:

S# = sentence number, TT = total time reading, PTpW = process time per word, RPW = rate per word

S#	words	TT	PTpW	RPW
1	13	2.933	0.226	0.113
2	19	4.167	0.219	0.073
3	7	0.733	0.105	0.105
4	6	1.950	0.325	0.325
5	10	10.833	1.083	0.271
6	12	1.400	0.117	0.058
7	8	2.533	0.317	0.158

Interpreting the Raw Data: The Sentence List is simply a verbatim dump of the passage as you typed it into MakeMoveWind. The sentences are numbered so that you may refer to them this way while looking at the other tables in the outut. Line numbers that have a . next to them are blank lines in the text (e. g., if there is double spacing in the text every other line in the output will show only a . on that line.) The table labeled Raw Data shows the sentences that were read in the

order in which they were read and the duration on each reading. Only sentences that were read will appear in this list.

Interpreting the Summary Data: The table labeled Summary Data presents a compiled version of the information presented in Raw Data. Each sentence is listed along with the number of words in it; the total amount of time for which the sentence was read is reported in the third column. Blank line numbers will appear as as a row of zeros in the summary table. Two measures are derived: process time per word (PTpW) and rate per word (RPW). PTpW is the total time divided by the number of words in the sentence. The RPW measure takes the number of words in the sentence and multiplies that value by the number of times the sentence was examined. The total time is then divided by the product.

Where to Write for Source Code

The application and the source code are available from the third author whose address is Peabody College, Box 45; Vanderbilt University; Nashville, TN 37203. (615) 322-8135; E-mail: GoldmanS@vuctrvax.bitnet. If you want to receive the application, please send an 800 K formatted disk with your request.

MoveWind and MakeMoveWindTest Known Bugs

• In the editor, you must Save As... every time instead of Save. This is a mystery bug. Save works in the Lightspeed environment but doesn't in the stand-alone application. Possibly this is due to SFReply.VRefNum becoming invalid after a while.

• The sequence builder experiences difficulty when you click on the top item in any of the lists. Another mystery. Click a trillion times and one of the clicks will work.

• If a passage file is listed in the sequence file but doesn't exist, you will get the message BOOM! ID 11 and you will have to re-start the entire system.

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